

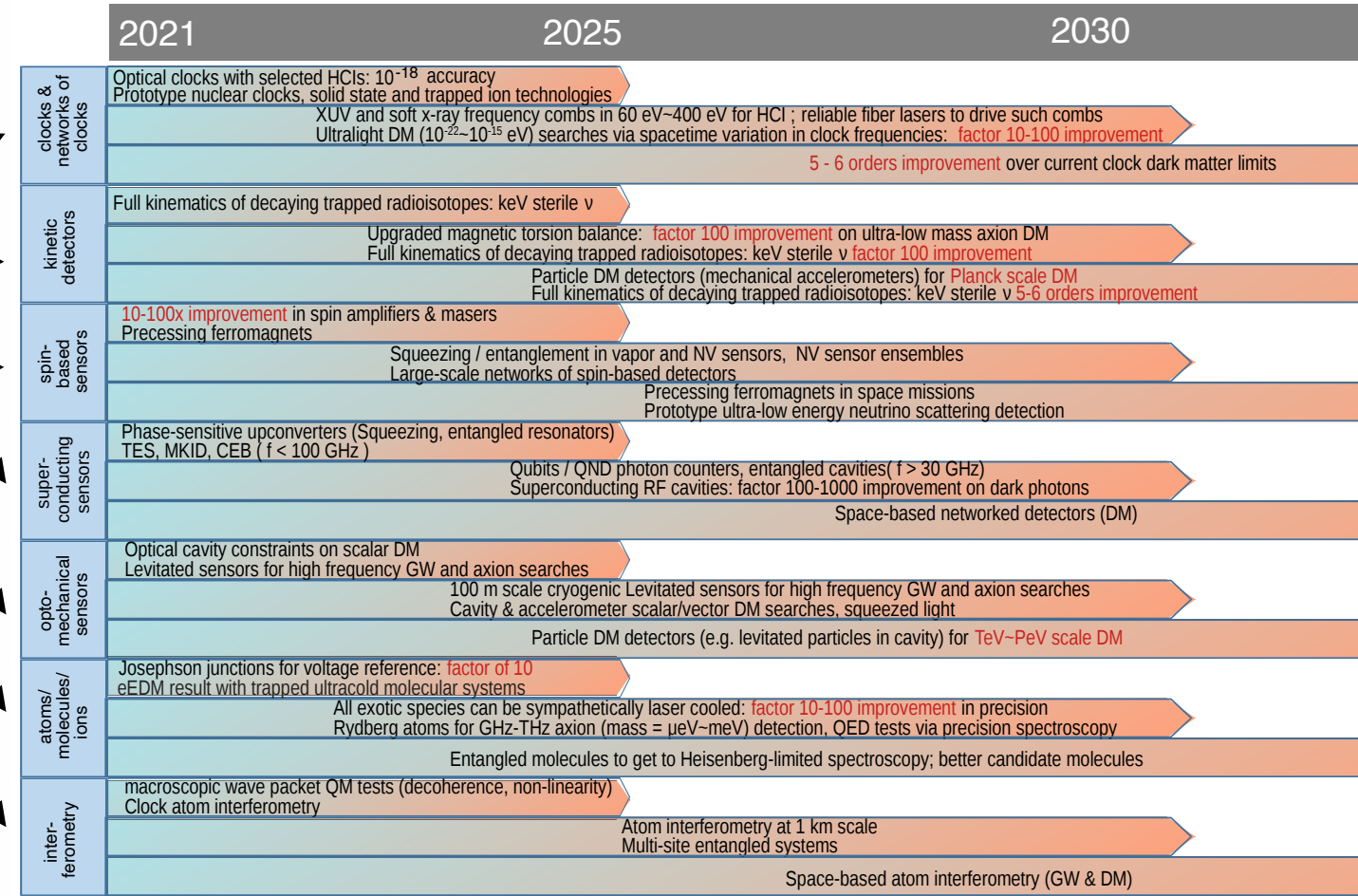
# Implementation of the ECFA detector R&D roadmap on quantum sensing

# What's next?

In line with the RECFA R&D roadmap, it makes sense to consider a quantum-sensing R&D program that brings together the following strands to agree on *the most relevant technology developments*:

- Clocks and clock networks 5.3.1
- Kinetic detectors 5.3.2
- Spin-based sensors 5.3.3
- Superconducting sensors 5.3.3
- Optomechanical sensors 5.3.4
- Atoms/molecules/ions 5.3.5
- Atom interferometry 5.3.5
- Metamaterials, 0/1/2D-materials
- Quantum materials 5.3.6

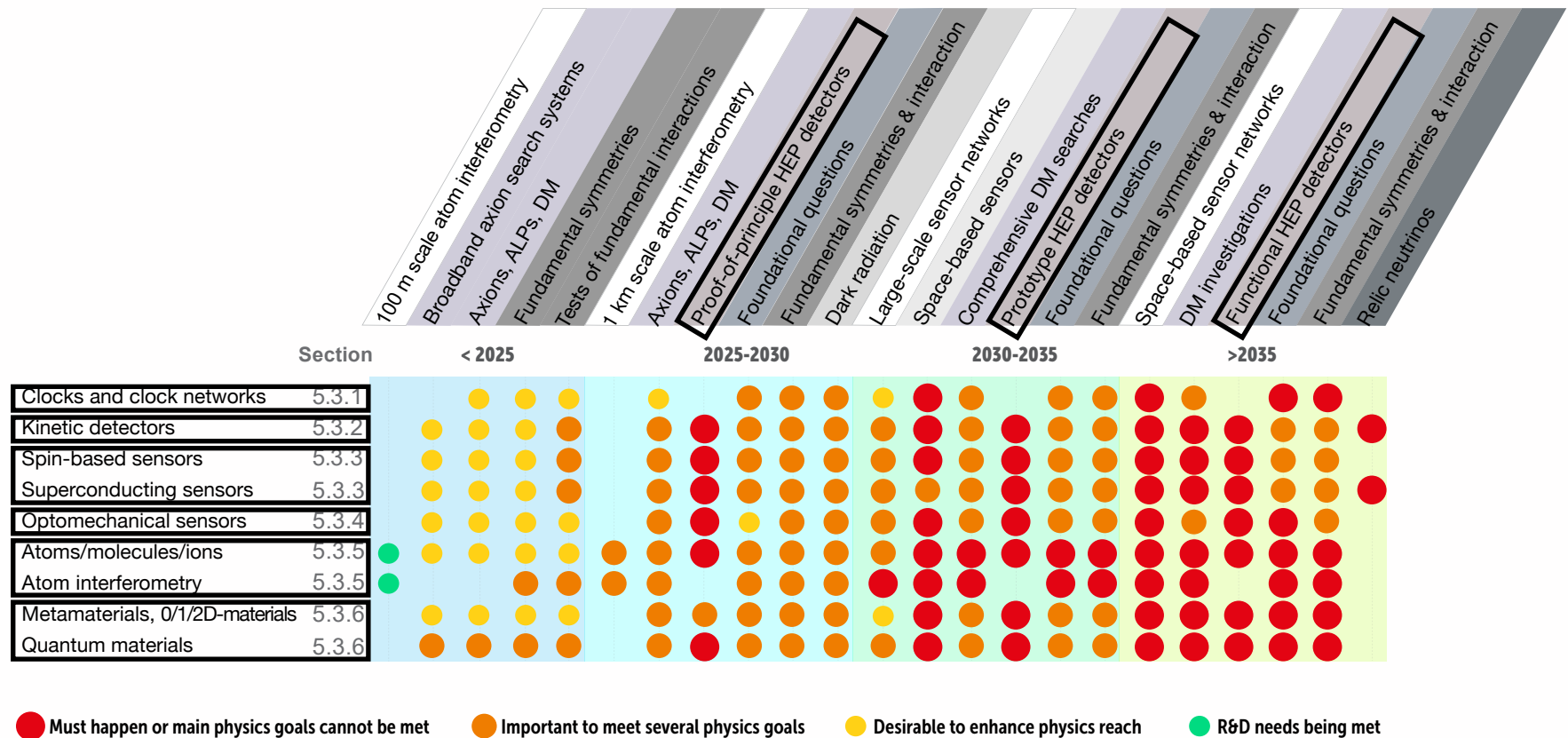
also, but not exclusively for HEP!



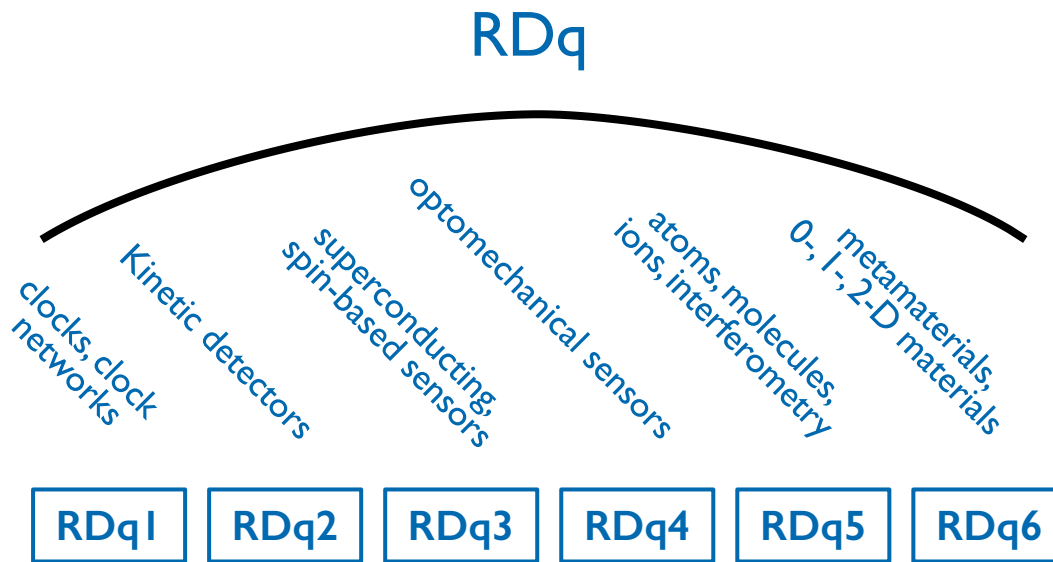
# RECFA Detector R&D roadmap 2021

<https://cds.cern.ch/record/2784893>

## Chapter 5: Quantum and Emerging Technologies Detectors



# RDq Collaboration and Platforms



- RDq collaboration anchored at CERN with spokesperson, CB, Int. Adv. Board;
- RDq has 6 sensor-family specific R&D platforms (RDq1 .. RDq6) each with their own coordinator, coordination board and project evaluation board;
- RDqi can and should be hosted in different national labs or research institutions world-wide, to reflect the strengths and interests of the hosting entity
- Attempt to have theoretical physicists involved in each platform

Building on this proposed structure, next steps are:

- ✓ • Contact family of experts in quantum technologies that was involved in the ECFA roadmap to:
- ✓ • Brainstorm around possible (HEP) applications;
- ✓ • Discuss potential convenors for the RDqi and host institutions;
- Identify projects (WPs) for the various platforms
- Start building communities of experts around the RDqi's;
- Prepare for April meeting (3.4~6.4 @ CERN & ZOOM among convenors)



ECFA Detector Panel  
**EDP**

follows developments through involvement in:

Detector R&D Committee  
**DRDC**

initial phase

1

submits proposal based on  
~12 initial WP's to DRDC;  
(RDq spokesperson)

evaluates DRD5 proposal

2

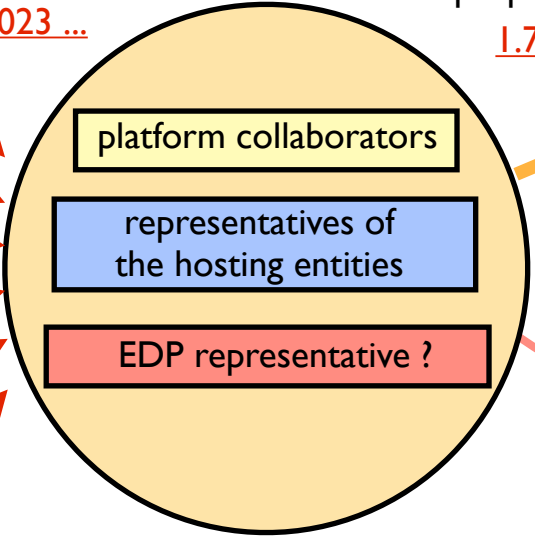
reports to DRDC;  
informs about new ECFA-  
relevant developments  
(RDq spokesperson)

follows progress of platforms;  
follows DRDC approved projects;  
verifies that focus of projects  
is along lines of roadmap

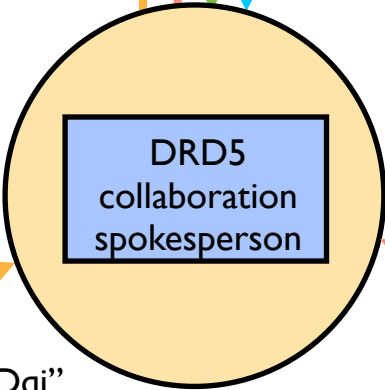
interested parties  
approached by  
platform  
convenors  
1.1.2023 ...

- 1 clocks, clock networks
- 2 kinetic detectors
- 3 superconducting, spin-based sensors
- 4 optomechanical sensors
- 5 atoms, molecules, ions, interferometry
- 6 metamaterials, 0-, 1-, 2-D materials

projects proposed by collaborators  
15.3.2023 ...



~12 projects selected for proposal / LOI  
1.7.2023



"WP RDqi"

new RDq projects internally evaluated  
> 1.1.2024

proto-collaboration discussions & proposal preparation  
3.4 - 6.4, 2023 ...

draft 2/2/23 M. Doser

ECFA

EDP

DRDC

reporting

> 1.1.2024

funding agencies | funding agencies

grant requests for DRDC-approved proposal projects

grant requests for RDq-vetted proposal projects

reports to DRDC; informs about new ECFA-relevant developments (RDq spokesperson)

follows progress of platforms; follows DRDC approved projects; verifies that focus of projects is along lines of roadmap

- 1 clocks, clock networks
- 2 kinetic detectors
- 3 superconducting, spin-based sensors
- 4 optomechanical sensors
- 5 atoms, molecules, ions, interferometry
- 6 metamaterials, 0-, 1-, 2-D materials

projects proposed by collaborators

platform collaborators

representatives of the hosting entities

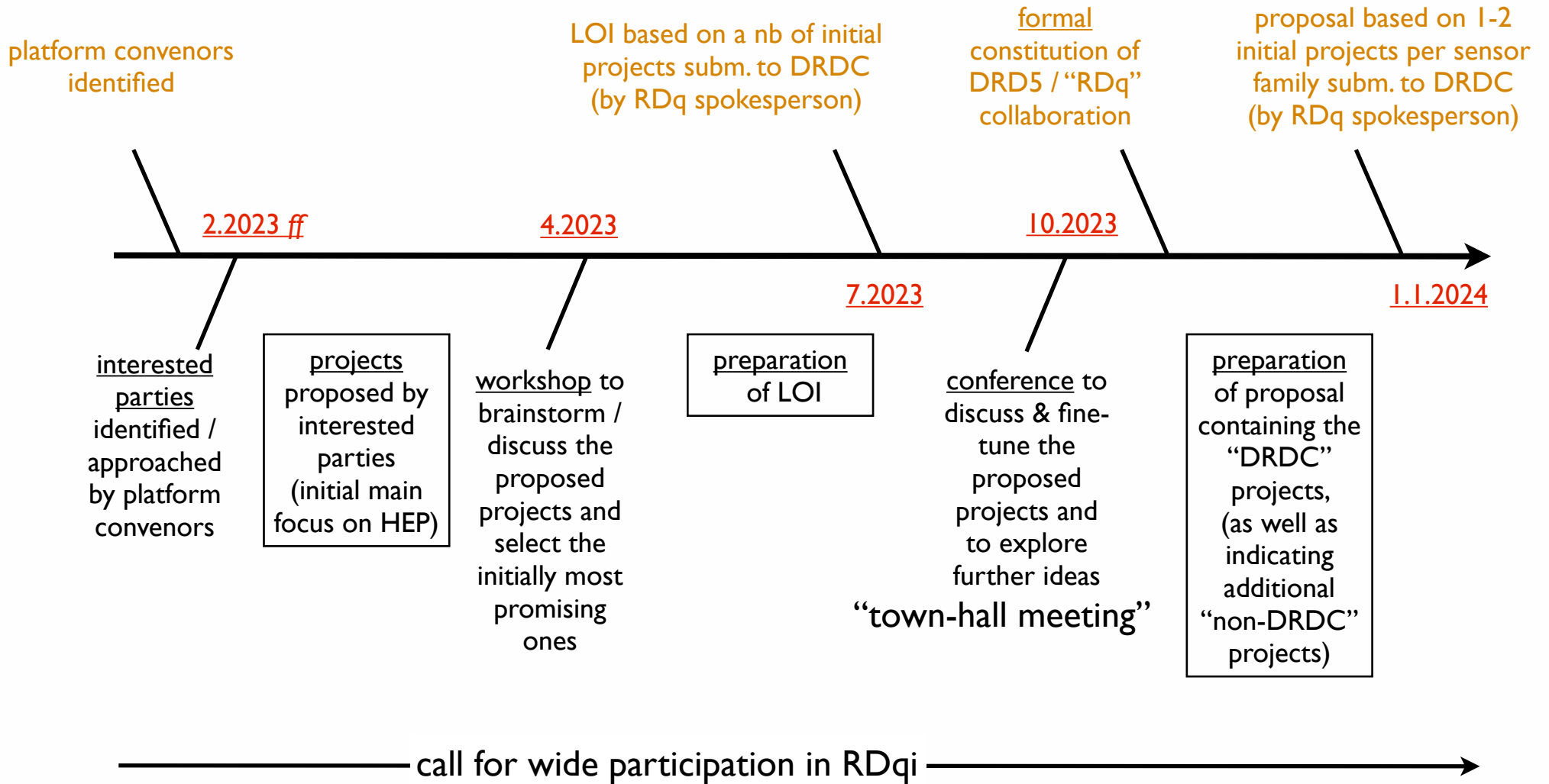
int. advisory committee ?

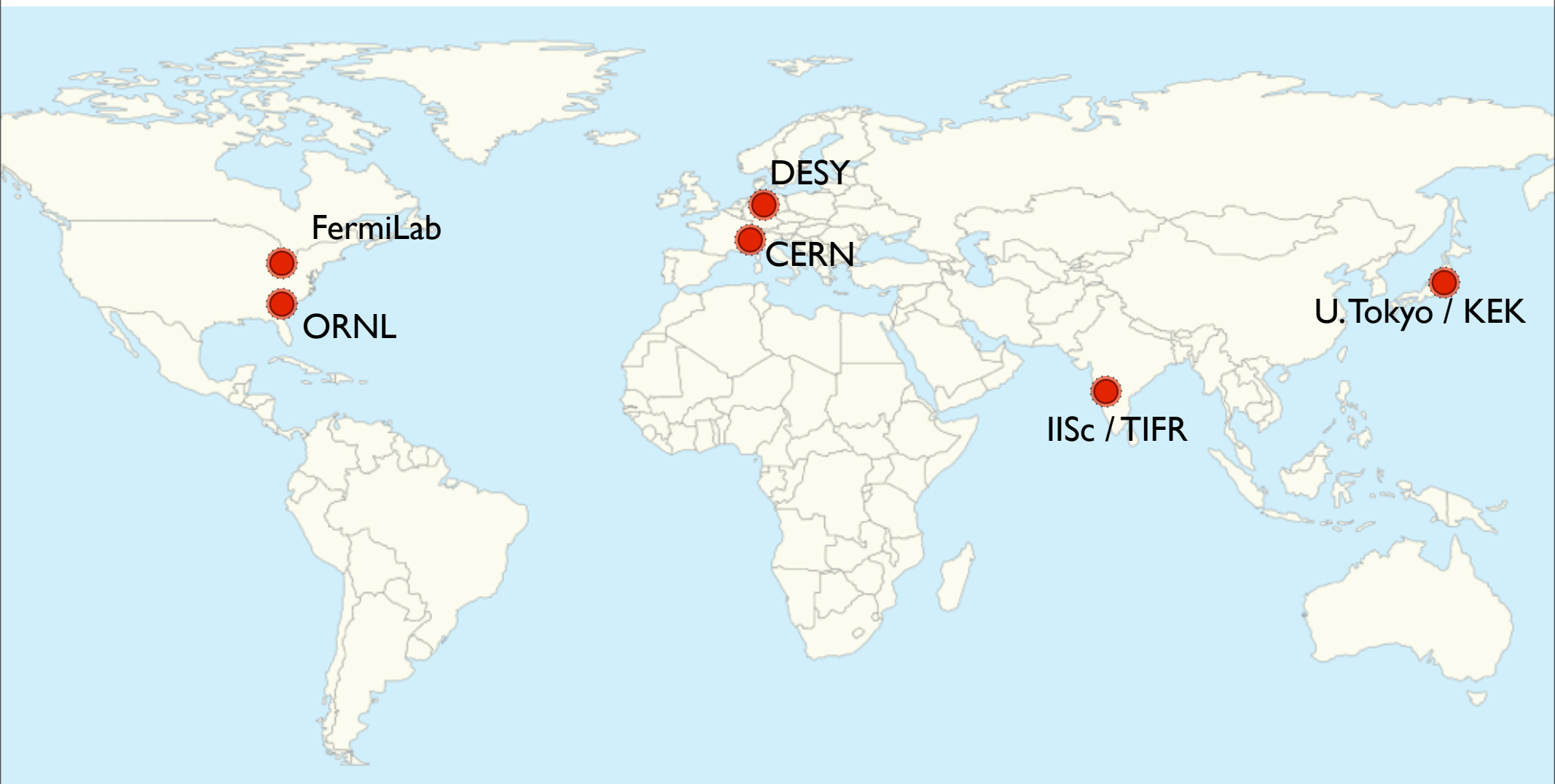
project evaluation board discussions & proposal evaluations for new RDq projects

DRD5 collaboration spokesperson

new RDq projects internally evaluated

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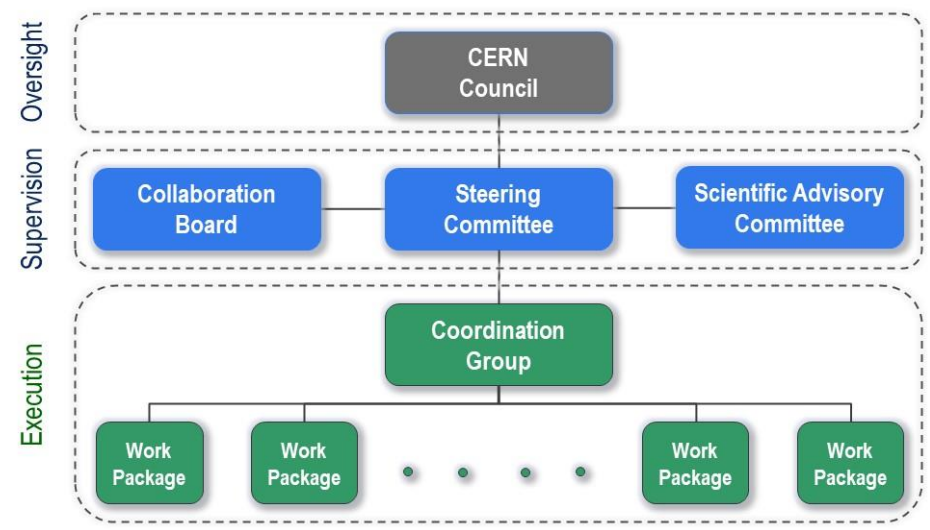


● possible ECFA TF5 family platforms (6 families) = organizational responsibility for a given family

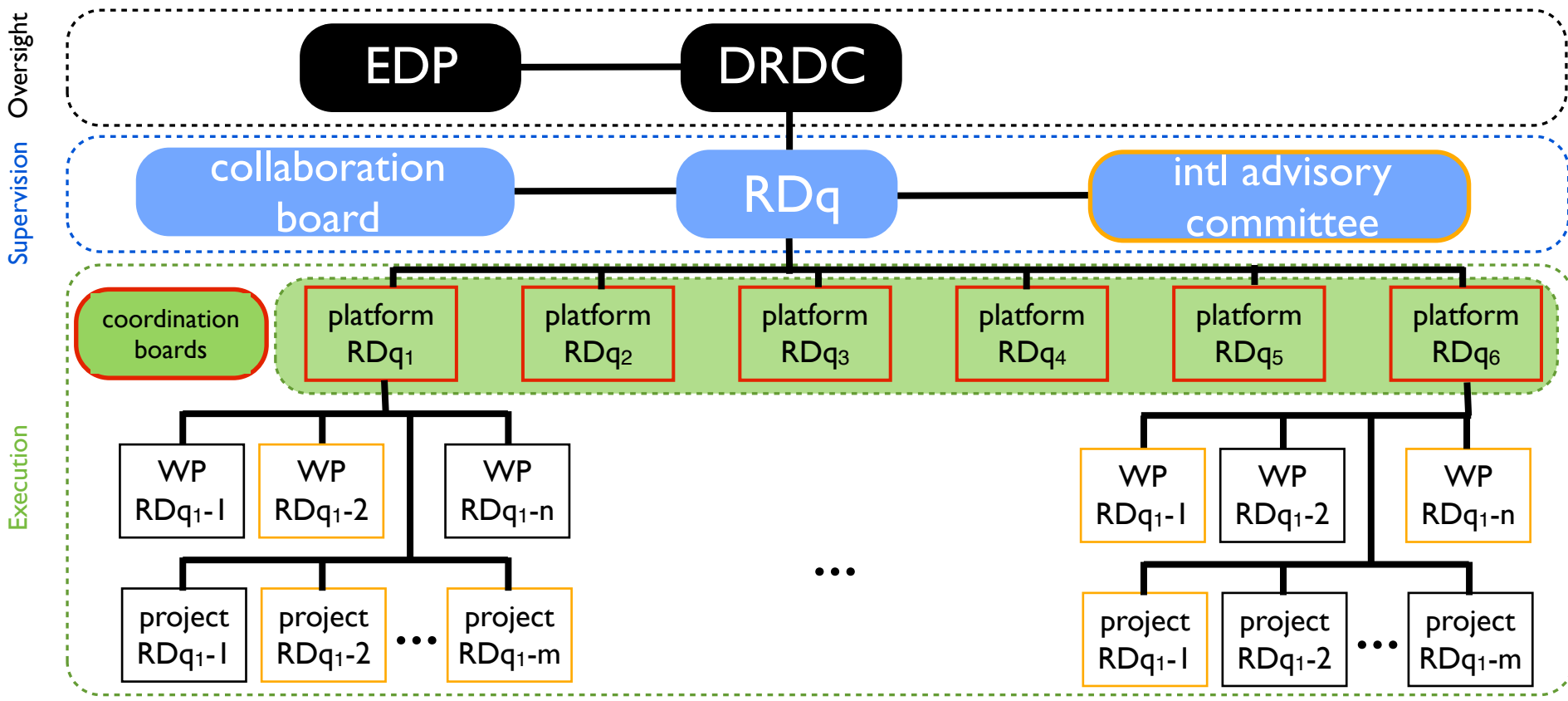


# structure of RDq

example from FCC



[https://fcc.web.cern.ch/Documents/Organisation/FCC-1409051000-JGU\\_GovernanceStructure\\_V0200.pdf](https://fcc.web.cern.ch/Documents/Organisation/FCC-1409051000-JGU_GovernanceStructure_V0200.pdf)



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